

Remarks/Arguments

Claims 3-15 and 52-69 remain in the application. Claims 1, 2 and 16-51 are cancelled. Claims 3, 52, and 65 are currently amended.

Election/Restriction

Applicant affirms election without traverse of claims 3-15 and 52-69. Applicant requests that claims 1, 2 and 16-51 be cancelled from the application.

Interview Summary

Applicant wishes to thank the Examiner for conducting the telephone interview of March 31, 2004 and for consenting to the follow-up discussion of April 1, 2004. Having regard to rejected claims 3-15 and 52-69, no agreement was reached during either telephone conversation. Applicant argued essentially that the prior art currently of record fails to teach a method of controlling a chemical reaction in a liquid continuous sample, wherein plasma (or an arc) is formed within the liquid continuous sample. Examiner agreed that none of the prior art currently of record teaches formation of plasma (or an arc) within a liquid continuous sample, but also noted that this feature is not recited at either one of rejected claims 3 or 52. Applicant subsequently proposed amendments to rejected claims 3 and 52 in order to more clearly define the inventive subject matter. In particular, the terms "breakdown condition" and "pre-breakdown condition" are amended to read --dielectric breakdown condition-- and --dielectric pre-breakdown condition--, respectively. Applicant further argued that one of skill in the art would understand the term "dielectric breakdown" to mean that an arc or plasma is formed within the liquid continuous sample.

Claim Rejections Under 35 USC § 112

Claims 3 and 52 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Regarding claim 3, the phrase "the chemical process" is lacking antecedent basis.

Claim 3 has been amended at step d) to recite “controlling the chemical reaction in dependence upon a feedback signal related to the indication of at least one of the dielectric breakdown condition and the dielectric pre-breakdown condition.” Antecedent basis for the chemical reaction is provided in the preamble of claim 3. Applicant respectfully submits that amended claim 3 complies with 35 U.S.C. 112, second paragraph. Applicant further submits that the term “reaction” is considered to have a breadth and scope equivalent to that of the term “process.” Accordingly, amending the term “the chemical process” to read -- the chemical reaction-- is not intended to in any way narrow the scope of claim 3. Favorable reconsideration is kindly requested.

Regarding claim 52, the phrase “the chemical process” is lacking antecedent basis.

Claim 52 has been amended at step d) to recite “controlling the chemical reaction in dependence upon a feedback signal related to the indication of at least one of the breakdown condition and the pre-breakdown condition.” Antecedent basis for the chemical reaction is provided in the preamble of claim 52. Applicant respectfully submits that amended claim 52 complies with 35 U.S.C. 112, second paragraph. Applicant further submits that the term “reaction” is considered to have a breadth and scope equivalent to that of the term “process.” Accordingly, amending the term “the chemical process” to read -- the chemical reaction-- is not intended to in any way narrow the scope of claim 52. Favorable reconsideration is kindly requested.

Claim Rejections Under 35 USC § 103

Claims 3, 6-8, 14, 52-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thomason (6,267,933).

Claim 3 has been amended. In particular, the terms “breakdown condition” and “pre-breakdown condition” have been amended to read --dielectric breakdown condition-- and --dielectric pre-breakdown condition--, respectively. Some examples of support for the proposed amendments may be found in the application as originally filed at paragraph [0025] where the local dielectric breakdown is described, and at claims 21 and 22. No new matter has been added in the proposed amendments.

Referring now to the attached Declaration under 37 C.F.R. 1.132, Applicant respectfully submits that the term “dielectric breakdown” is well known in the field of the invention and has a specific meaning that will be readily understood by one of ordinary skill in the art. In particular, as is stated at point 2 of the attached Declaration, “dielectric breakdown occurs when a critical electric field is exceeded, and branched conduction paths grow at microsecond speeds through a sample. A **dielectric breakdown** event is an **abrupt discharge, or arc**, that occurs as a result of a failure of the sample to behave as an insulator under the influence of the critical electric field.” Furthermore, as is stated at point 3 of the attached Declaration, “in the case of a liquid sample, intense ionization occurring at the branch tips of the conduction paths **results in plasma formation within the liquid sample.**” Applicant respectfully submits that the above definition of dielectric breakdown is consistent with the description of the local dielectric breakdown provided at paragraph [0025] of the application as originally filed.

Applicant respectfully submits that the Office Action mailed on January 29, 2004 fails to establish a *prima facie* case of obviousness, since the Thomason reference does not teach or suggest all the claim limitations as recited at amended claim 3. Accordingly, Applicant respectfully traverses the rejection of amended claim 3 as being unpatentable over Thomason under 35 U.S.C. 103(a). In particular, Thomason does not teach a step of “applying to the liquid continuous sample an electric field having a carrying frequency greater than 100 kHz and less than 200 GHz and no limitation on the modulation of the electric field, **wherein the amplitude of the electric field is sufficient to cause** at least one of a **dielectric** breakdown condition and a **dielectric** pre-breakdown condition within the liquid continuous sample.” Thomason merely teaches an apparatus and method for preparing energized fluids. More specifically, at column 10 line 64, to column 11 line 22, Thomason states that exposure to the combination signal results in an energized fluid having a millivolt reading of –10 to –100 millivolts, which persists for a period of time after the device is turned off. Thomason does not teach or suggest that exposure to the combination signal causes at least one of a **dielectric** breakdown condition and a **dielectric** pre-breakdown condition within the liquid sample. Similarly, Thomason does not teach or suggest formation of plasma or an arc within the liquid sample.

Furthermore, Applicant disagrees with the statement at page 6 of the Office Action mailed on January 29, 2004 that the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the reference's teaching because "the provision of mechanical or automated means to replace manual activity was held to have been obvious", *In re Venner*, 120 USPQ 192. In fact, as was discussed during the telephone interview of March 31, 2004, Thomason **does not teach or suggest any manual activity** that is equivalent to the steps of detecting and controlling, as defined at steps c) and d), respectively, of amended claim 3. Accordingly, Applicant respectfully submits that *In re Venner* does not apply, since steps c) and d) define additional steps that are not disclosed or suggested by Thomason, and do not merely provide mechanical or automated means to replace manual activity.

Applicant respectfully submits that amended claim 3 is now in proper form for allowance. Favorable reconsideration is kindly requested.

Having regard to claim 6, Thomason does not teach or suggest applying to the liquid continuous sample an additional low frequency electric field within the industrial range of 50 Hz to 60 Hz. Thomason merely teaches first, second, third and fourth Rf signal generators that generate the following Rf signals: 1100, 1500, 1800 and 2100 KHz, respectively. Applicant respectfully submits that claim 6, which depends from believed allowable amended claim 3, is also in proper form for allowance. Favorable reconsideration is kindly requested.

Claim 7 depends from believed allowable claim 3 and is also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Having regard to claim 8, Thomason does not teach or suggest applying to the liquid continuous sample an additional magnetic field. Thomason merely teaches at column 1, lines 26 to 44, that magnetic units are known to ineffectively remove scale from water lines. Thomason does not teach application of an additional magnetic field in combination with the features of the instant invention as recited at amended claim 3.

Accordingly, claim 8 is believed to be in proper form for allowance, and favorable reconsideration is kindly requested.

Claim 14 depends from believed allowable claim 3 and is also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Applicant respectfully submits that the arguments presented above with regard to amended claim 3 also apply to amended claim 52 *mutatis mutandis*. Accordingly, amended claim 52 is believed to be in proper form for allowance, and favorable reconsideration is kindly requested.

Claims 53 to 55 depend from believed allowable claim 53 and are also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Claim 56 recites “wherein a second other carrying frequency of the electric field is selected in dependence upon the dielectric properties of the liquid sample to control a second other chemical reaction.” Applicant respectfully submits that Thomason does not explicitly teach a chemical reaction at all. Accordingly, Thomason does not teach or suggest a second other chemical reaction. Applicant respectfully submits that no modification of Thomason results in the invention as recited at claim 56. Accordingly, claim 56, which depends from believed allowable claim 52, is also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Claim 57 recites “wherein the step of applying the electric field includes the step of adjusting at least one of a shape, duration, carrying frequency and amplitude of the electric field for inducing a dielectric pre-breakdown condition within the liquid sample.” As discussed with reference to amended claim 3, Thomason does not teach or suggest that either one of a “**dielectric** pre-breakdown condition” or a “**dielectric** breakdown condition” results within the energized fluid as a result of exposure to the combination signal. Accordingly, claim 57, which depends from believed allowable claim 52, is also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Applicant respectfully submits that the arguments presented above with regard to claim 57 also apply to claim 58 *mutatis mutandis*. Accordingly, claim 58 is believed to be in proper form for allowance, and favorable reconsideration is kindly requested.

Applicant respectfully submits that the arguments presented above with regard to claim 57 also apply to claim 59 *mutatis mutandis*. Accordingly, claim 59 is believed to be in proper form for allowance, and favorable reconsideration is kindly requested.

Claims 60 to 64 depend either directly or indirectly from believed allowable amended claim 52 and are also believed to be allowable. Favorable reconsideration is kindly requested.

Amended claim 65 recites the step of “providing an acoustic sensor for detecting an indication of the dielectric pre-breakdown condition.” Applicant respectfully submits that Thomason does not teach, either expressly or inherently, providing an acoustic sensor for detecting an indication of the dielectric pre-breakdown condition. In fact, Thomason does not teach or suggest that the “dielectric pre-breakdown condition” results within the energized fluid as a result of exposure to the combination signal. Applicant respectfully submits that there is no teaching or suggestion to provide an acoustic sensor for detecting an indication of the pre-breakdown condition as claimed at claim 65. Accordingly, claim 65, which depends from believed allowable claim 52, is also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Claim 66 recites the step of “providing a temperature sensor for detecting a temperature within the reactor.” Applicant respectfully submits that Thomason does not teach, either expressly or inherently, providing a temperature sensor for detecting a temperature within the reactor. Furthermore, there is no teaching or suggestion of the desirability of providing a temperature sensor for detecting a temperature within the reactor. Accordingly, claim 66, which depends from believed allowable claim 52, is also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Claim 67 recites the step of “increasing the temperature of the liquid sample within the reactor.” Applicant respectfully submits that Thomason merely teaches energizing fluids, resulting in fluids carrying a persistent negative charge. There is no suggestion or teaching that the temperature of the liquid sample is increased within the reactor. Accordingly, claim 67, which depends from believed allowable claim 52, is also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Claim 68 recites the step of “providing a gas flow meter for detecting at least one of the presence and amount of at least a gas within the reactor.” Applicant respectfully submits that claim 68, which depends from believed allowable claim 52, is also in proper form for allowance. Favorable reconsideration is kindly requested.

Claim 69 recites the step of “providing a flow of a predetermined gas within the reaction chamber.” Thomason does not teach or suggest providing a flow of a predetermined gas within the reaction chamber. Applicant respectfully submits that claim 69, which depends from believed allowable claim 52, is also in proper form for allowance. Favorable reconsideration is kindly requested.

Claims 3-5, 8, 11, 13, 15, 52-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lagunas-Solar et al. (6,638,475).

Claim 3 has been amended. In particular, the terms “breakdown condition” and “pre-breakdown condition” have been amended to read --dielectric breakdown condition-- and --dielectric pre-breakdown condition--, respectively. Some examples of support for the proposed amendments may be found in the application as originally filed at paragraph [0025] where the local dielectric breakdown is described, and at claims 21 and 22. No new matter has been added in the proposed amendments.

Referring now to the attached Declaration under 37 C.F.R. 1.132, Applicant respectfully submits that the term “dielectric breakdown” is well known in the field of the invention and has a specific meaning that will be readily understood by one of ordinary skill in the art. In particular, as is stated at point 2 of the attached Declaration, “dielectric breakdown occurs when a critical electric field is exceeded, and branched conduction paths

grow at microsecond speeds through a sample. A **dielectric breakdown** event is an **abrupt discharge, or arc**, that occurs as a result of a failure of the sample to behave as an insulator under the influence of the critical electric field.” Furthermore, as is stated at point 3 of the attached Declaration, “in the case of a liquid sample, intense ionization occurring at the branch tips of the conduction paths **results in plasma formation within the liquid sample.**” Applicant respectfully submits that the above definition of dielectric breakdown is consistent with the description of the local dielectric breakdown provided at paragraph [0025] of the application as originally filed.

Applicant respectfully submits that the Office Action mailed on January 29, 2004 fails to establish a *prima facie* case of obviousness, since the Lagunas-Solar et al. reference does not teach or suggest all the claim limitations as recited at amended claim 3. Accordingly, Applicant respectfully traverses the rejection of amended claim 3 as being unpatentable over Lagunas-Solar et al. under 35 U.S.C. 103(a). In particular, Lagunas-Solar et al. does not teach a step of “applying to the liquid continuous sample an electric field having a carrying frequency greater than 100 kHz and less than 200 GHz and no limitation on the modulation of the electric field, **wherein the amplitude of the electric field is sufficient to cause** at least one of a **dielectric** breakdown condition and a **dielectric** pre-breakdown condition within the liquid continuous sample.” In contrast, Lagunas-Solar et al. teach an apparatus and method for introducing thermal energy into a host material, which is sufficient for causing irreversible changes in ineffective organisms, such that the thermal energy causes only reversible changes in the host material. Clearly, Lagunas-Solar et al. does not teach or suggest causing at least one of a **dielectric** breakdown condition and a **dielectric** pre-breakdown condition within the liquid sample. Similarly, Lagunas-Solar et al. does not teach or suggest formation of plasma or an arc within a liquid sample.

Furthermore, Applicant disagrees with the statement at page 6 of the Office Action mailed on January 29, 2004 that the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the reference’s teaching because “the provision of mechanical or automated means to replace

manual activity was held to have been obvious”, *In re Venner*, 120 USPQ 192. In fact, Lagunas-Solar et al. **does not teach or suggest any manual activity** that is equivalent to the steps of detecting and controlling, as defined at steps c) and d), respectively, of amended claim 3. Accordingly, Applicant respectfully submits that *In re Venner* does not apply, since steps c) and d) define additional steps that are not disclosed or suggested by Lagunas-Solar et al., and do not merely provide mechanical or automated means to replace manual activity.

Accordingly, amended claim 3 is believed to be in proper form for allowance and favorable reconsideration is kindly requested.

Claims 4, 5, 8, 11, 13, 15 depend either directly or indirectly from believed allowable amended claim 3 and are also believed to be allowable. Favorable reconsideration is kindly requested.

Having regard to amended claim 52, Applicant respectfully submits that support for each and every claim feature may be found in the parent application PCT/CA00/00140, filed on Feb. 15, 2000. Accordingly, Lagunas-Solar et al. is not citable against amended claim 52.

In any case, the arguments presented above with regard to amended claim 3 also apply to amended claim 52 *mutatis mutandis*. Accordingly, amended claim 52 is believed to be in proper form for allowance, and favorable reconsideration is kindly requested.

Claims 53 to 55 depend from believed allowable claim 53 and are also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Claim 56 recites “wherein a second other carrying frequency of the electric field is selected in dependence upon the dielectric properties of the liquid sample to control a second other chemical reaction.” Lagunas-Solar et al. does not explicitly teach a chemical reaction at all. Accordingly, Lagunas-Solar et al. does not teach or suggest a second other chemical reaction. Applicant respectfully submits that no modification of Lagunas-Solar et al. results in the invention as recited at claim 56. Accordingly, claim 56, which depends

from believed allowable claim 52, is also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Claim 57 recites “wherein the step of applying the electric field includes the step of adjusting at least one of a shape, duration, carrying frequency and amplitude of the electric field for inducing a dielectric pre-breakdown condition within the liquid sample.” As discussed with reference to amended claim 3, Lagunas-Solar et al. does not teach or suggest that introduction of thermal energy into the host material results in the pre-breakdown condition or the breakdown condition within the host material. Furthermore, Lagunas-Solar et al. does not explicitly teach a chemical reaction at all. Accordingly, the modification of the teaching of Lagunas-Solar et al. to include adjusting at least one of a shape, duration, carrying frequency and amplitude of the electric field for inducing a dielectric pre-breakdown condition within the liquid sample would change the principle of operation of the teachings of Lagunas-Solar et al., rendering the invention of Lagunas-Solar et al. unsuitable for its intended purpose. Accordingly, claim 57, which depends from believed allowable claim 52, is also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Applicant respectfully submits that the arguments presented above with regard to claim 57 also apply to claim 58 *mutatis mutandis*. Accordingly, claim 58 is believed to be in proper form for allowance, and favorable reconsideration is kindly requested.

Applicant respectfully submits that the arguments presented above with regard to claim 57 also apply to claim 59 *mutatis mutandis*. Accordingly, claim 59 is believed to be in proper form for allowance, and favorable reconsideration is kindly requested.

Claims 60 to 61 and 65 to 67 depend either directly or indirectly from believed allowable amended claim 52 and are also believed to be allowable. Favorable reconsideration is kindly requested.

Claims 3, 9-15, 52-62, and 65-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berger (5,904,816).

Claim 3 has been amended. In particular, the terms “breakdown condition” and “pre-breakdown condition” have been amended to read --dielectric breakdown condition-- and --dielectric pre-breakdown condition--, respectively. Some examples of support for the proposed amendments may be found in the application as originally filed at paragraph [0025] where the local dielectric breakdown is described, and at claims 21 and 22. No new matter has been added in the proposed amendments.

Referring now to the attached Declaration under 37 C.F.R. 1.132, Applicant respectfully submits that the term “dielectric breakdown” is well known in the field of the invention and has a specific meaning that will be readily understood by one of ordinary skill in the art. In particular, as is stated at point 2 of the attached Declaration, “dielectric breakdown occurs when a critical electric field is exceeded, and branched conduction paths grow at microsecond speeds through a sample. A **dielectric breakdown event is an abrupt discharge, or arc**, that occurs as a result of a failure of the sample to behave as an insulator under the influence of the critical electric field.” Furthermore, as is stated at point 3 of the attached Declaration, “in the case of a liquid sample, intense ionization occurring at the branch tips of the conduction paths **results in plasma formation within the liquid sample.**” Applicant respectfully submits that the above definition of dielectric breakdown is consistent with the description of the local dielectric breakdown provided at paragraph [0025] of the application as originally filed.

Applicant respectfully submits that the Office Action mailed on January 29, 2004 fails to establish a *prima facie* case of obviousness, since the Berger reference does not teach or suggest all the claim limitations as recited at amended claim 3. Accordingly, Applicant respectfully traverses the rejection of amended claim 3 as being unpatentable over Berger under 35 U.S.C. 103(a). In particular, Berger does not teach a step of “applying to the liquid continuous sample an electric field having a carrying frequency greater than 100 kHz and less than 200 GHz and no limitation on the modulation of the electric field, **wherein the amplitude of the electric field is sufficient to cause** at least one of a dielectric breakdown condition and a dielectric pre-breakdown condition within the liquid continuous sample.” In contrast, Berger teaches an apparatus and method for

subjecting liquids containing alkyl groups to a plasma treatment. More specifically, a reaction gas plasma is formed from a reaction gas containing a reactive group to be introduced into the liquid containing alkyl groups (see col. 4, lines 15-17). Plasma is not formed within the liquid, but rather plasma is formed in the gas phase above the liquid and then used to treat the liquid. Berger does not teach or suggest that plasma treatment of a liquid containing alkyl groups results in the dielectric pre-breakdown condition or the dielectric breakdown condition within the liquid containing alkyl groups.

Furthermore, Applicant disagrees with the statement at page 6 of the Office Action mailed on January 29, 2004 that the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the reference's teaching because "the provision of mechanical or automated means to replace manual activity was held to have been obvious", *In re Venner*, 120 USPQ 192. In fact, **Berger does not teach or suggest any manual activity** that is equivalent to the steps of detecting and controlling, as defined at steps c) and d), respectively, of amended claim 3. Accordingly, Applicant respectfully submits that *In re Venner* does not apply, since steps c) and d) define additional steps that are not disclosed or suggested by Berger, and do not merely provide mechanical or automated means to replace manual activity.

Accordingly, amended claim 3 is believed to be in proper form for allowance and favorable reconsideration is kindly requested.

Claims 9-15 depend either directly or indirectly from believed allowable amended claim 3 and are also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Applicant respectfully submits that the arguments presented above with regard to amended claim 3 also apply to amended claim 52 *mutatis mutandis*. Accordingly, amended claim 52 is believed to be in proper form for allowance, and favorable reconsideration is kindly requested.

Claims 52-55 depend either directly or indirectly from believed allowable amended claim 52 and are also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Claim 56 recites “wherein a second other carrying frequency of the electric field is selected in dependence upon the dielectric properties of the liquid sample to control a second other chemical reaction.” Applicant respectfully submits that Berger teaches a second carrying frequency selected for producing plasma in the gas phase. Claim 55, which depends from believed allowable amended claim 52, is also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Claims 57-62 depend either directly or indirectly from believed allowable amended claim 52 and are also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Amended claim 65 recites, “comprising the step of providing an acoustic sensor for detecting an indication of the dielectric pre-breakdown condition.” Applicant respectfully submits that Berger does not teach, either expressly or inherently, providing an acoustic sensor for detecting an indication of the dielectric pre-breakdown condition. In fact, Berger does not teach or suggest that the “dielectric pre-breakdown condition” results within the liquid containing alkyl groups. Applicant respectfully submits that there is no teaching or suggestion to provide an acoustic sensor for detecting an indication of the dielectric pre-breakdown condition as claimed at amended claim 65. Accordingly, amended claim 65, which depends from believed allowable claim 52, is also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Claims 66-67 depend from believed allowable amended claim 52 and are also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Claims 3, 9-15, 52-55, 57-62, and 65-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horowitz (4,077,870).

Claim 3 has been amended. In particular, the terms “breakdown condition” and “pre-breakdown condition” have been amended to read --dielectric breakdown condition-- and --dielectric pre-breakdown condition--, respectively. Some examples of support for the proposed amendments may be found in the application as originally filed at paragraph [0025] where the local dielectric breakdown is described, and at claims 21 and 22. No new matter has been added in the proposed amendments.

Referring now to the attached Declaration under 37 C.F.R. 1.132, Applicant respectfully submits that the term “dielectric breakdown” is well known in the field of the invention and has a specific meaning that will be readily understood by one of ordinary skill in the art. In particular, as is stated at point 2 of the attached Declaration, “dielectric breakdown occurs when a critical electric field is exceeded, and branched conduction paths grow at microsecond speeds through a sample. A **dielectric breakdown** event is an **abrupt discharge, or arc**, that occurs as a result of a failure of the sample to behave as an insulator under the influence of the critical electric field.” Furthermore, as is stated at point 3 of the attached Declaration, “in the case of a liquid sample, intense ionization occurring at the branch tips of the conduction paths **results in plasma formation within the liquid sample.**” Applicant respectfully submits that the above definition of dielectric breakdown is consistent with the description of the local dielectric breakdown provided at paragraph [0025] of the application as originally filed.

Applicant respectfully submits that the Office Action mailed on January 29, 2004 fails to establish a *prima facie* case of obviousness, since the Horowitz reference does not teach or suggest all the claim limitations as recited at amended claim 3. Accordingly, Applicant respectfully traverses the rejection of amended claim 3 as being unpatentable over Horowitz under 35 U.S.C. 103(a). In particular, Horowitz does not teach a step of “applying to the liquid continuous sample an electric field having a carrying frequency greater than 100 kHz and less than 200 GHz and no limitation on the modulation of the electric field, **wherein the amplitude of the electric field is sufficient to cause** at least one of a dielectric breakdown condition and a dielectric pre-breakdown condition within the liquid continuous sample.” In contrast, Horowitz teaches an apparatus and method for

electrically cracking petroleum crude. More specifically, the petroleum crude to be cracked is mixed with an additive substance called an energy transfer medium (see col. 4, lines 16-18). The energy in the electrical transfer is preferentially transmitted of the additive atoms of the energy transfer medium, with none of the energy going directly into the crude. Subsequently, the energy is transferred from the energy transfer medium to molecules of the crude during collisions therebetween. Notably, the mixture of crude and energy transfer medium is particalized (sprayed or vaporized) and fed into a continuous flow reaction or cracking chamber. As the particalized mixture is fed into the chamber it is supplied with an electrical discharge. Horowitz does not teach or suggest that the dielectric pre-breakdown condition or the dielectric breakdown condition results within the particalized mixture. Furthermore, Horowitz does not teach or suggest formation of plasma or an arc within a liquid sample.

Furthermore, Applicant disagrees with the statement at page 6 of the Office Action mailed on January 29, 2004 that the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the reference's teaching because "the provision of mechanical or automated means to replace manual activity was held to have been obvious", *In re Venner*, 120 USPQ 192. In fact, Horowitz **does not teach or suggest any manual activity** that is equivalent to the steps of detecting and controlling, as defined at steps c) and d), respectively, of amended claim 3. Accordingly, Applicant respectfully submits that *In re Venner* does not apply, since steps c) and d) define additional steps that are not disclosed or suggested by Horowitz, and do not merely provide mechanical or automated means to replace manual activity.

Accordingly, amended claim 3 is believed to be in proper form for allowance and favorable reconsideration is kindly requested.

Claims 9-15 depend either directly or indirectly from believed allowable amended claim 3 and are also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Applicant respectfully submits that the arguments presented above with regard to amended claim 3 also apply to amended claim 52 *mutatis mutandis*. Accordingly, amended claim 52 is believed to be in proper form for allowance, and favorable reconsideration is kindly requested.

Claims 53-54 depend from believed allowable amended claim 52 and are also believed to be allowable. Favorable reconsideration is kindly requested.

Claim 55 recites “wherein the carrying frequency of the electric field is selected in dependence upon the dielectric properties of the liquid sample.” Applicant respectfully submits that Horowitz teaches that the amount of energy that is accepted by the additive atoms, and thus the amount which is available to be given up to the crude molecules, depends on the atomic structure of the additive atoms. Horowitz further teaches that the amount of energy that can be given up is very specific. Applicant submits that Horowitz teaches that the properties of the electrical discharge are selected in dependence upon the atomic structure of the additive atoms. This teaches away from selecting the carrying frequency of the electric field in dependence upon the dielectric properties of the liquid sample, as claimed at claim 55. Accordingly, claim 55, which depends from believed allowable amended claim 52, is also believed to be allowable and favorable reconsideration is kindly requested.

Claims 57-62 depend from believed allowable amended claim 52 and are also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

Claims 65-67 depend from believed allowable amended claim 52 and are also believed to be in proper form for allowance. Favorable reconsideration is kindly requested.

No new matter has been added in the amended claims.

Applicant looks forward to favourable reconsideration of the present application.

**Please charge any additional fees required or credit any overpayment to Deposit
Account No: 50-1142.**

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'G Fre', with a long horizontal stroke extending to the right.

Gordon Freedman, Reg. No. 41,553

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